

REMARKS

Claims 1-16, 19-97, and 99-105 are now pending in the application. Claims 17, 18, and 98 have been canceled. Claims 19, 29, 43, 73, 76, 87, and 99 have been amended, Claims 62 and 63 have been amended and made independent by this amendment. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

APPLICANT INITIATED EXAMINER INTERVIEW SUMMARY

Applicants thank the Examiner for the interview granted on October 10, 2006 with Applicant's representative. During the interview the cited art, especially Allen and Codrington, were discussed in relation to the pending claims. Applicants' representative believes that an agreement was reached regarding allowable subject matter. For example, at least a tracking system was not taught in the cited art. In addition, the amendments and arguments herein include at least those amendments and arguments presented to the Examiner during the interview. Applicants submit that the amendments herein place the subject application in condition for allowance.

SUPPORT FOR CLAIM AMENDMENTS AS REQUIRED BY 37 C.F.R. 1.173(c)

Claim 87 has been amended to include previously filed Claim 98, which has now been canceled. Support for the amendments to Claim 87, therefore, can be found at the same location as support for Claims 87 and 98. Claim 87 is supported by at least column 2, lines 55-60; column 3, line 20 to column 4, line 65; and column 5, line 62 to column 6, line 15; and Claim 98 is supported by at least column 4, lines 16-31.

Claims 19 and 73 have been amended with subject matter similar to that included in previously added claims 98. Again, support for these amendments, therefore, can be found at the same location as support for Claim 98. Claim 98 is supported by at least column 4, lines 16-31.

Claims 62 and 63 have been amended into independent format to include each of the limitations of the claims from which they previously depended. Thus, Claims 62 and 63 include no additional subject matter and are of the same scope as previously submitted.

REJECTION UNDER 35 U.S.C. § 102 AND § 103

Claims 19-30, 38-40, 46-48, 51, 52, 55-56, 59-61, 66, 67, 69-72, 87-89, 91-97, 101, 103-105 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Allen (U.S. Pat. No. 4,945,914). Claims 31-33, 49, 50, 90, 98, 102 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Allen (U.S. Pat. No. 4,945,914) in view of Strohl Jr. et al. or Van Steenwyk et al. Claims 99, 100 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Allen ('914) in view of Strohl Jr. et al or Van Steenwyk et al as applied to Claim 98 above, and further in view of Codrington. Claims 34-37, 41-43 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Allen (4,945,914) in view of Lewin. Claims 44, 45, 53, 57, 58, 65, 68 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Allen ('914). Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen ('914) in view of Codrington. Claims

73-86 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Allen ('914) in view of Codrington. These rejections are respectfully traversed.

Allen is directed to an apparatus for relating images over time to other images for display of a portion of the anatomy with the use of fiducials. In particular, the fiducials can be positioned in the anatomy so that "subsequent images of the same anatomical volume area can be compared." See col. 9, Ins. 29-31. Allen appears to lack a teaching of tracking an instrument with a tracking system and only describes that image data must be continually taken to allow a computer system to guide an instrument. Allen also appears to lack tracking a second reference structure. See col. 15, Ins. 57-63. Allen further describes that the surgical instruments can be guided to the tumor by the computer with an imaging system placed in interactive mode therewith. The imaging data is thus constantly fed to the computer to allow the computer to track the progress and the extent of the surgery. See col. 16, Ins. 63-67.

Codrington is directed to a magnetic resonance imaging device and a catheter including a coil to be imaged by the magnetic resonance imaging device. The catheter includes the loop which locally distorts the magnetic resonance image providing an "image cursor" on the magnetic resonance imaging display. Codrington further specifies that the excitation should be weak so that the cursor is minimal in extent so it does not distort the image to a great degree. See column 2, lines 41-46. Thus, Codrington teaches that to determine the position of the catheter tip, images must be continuously taken of the patient and the catheter to display it on the display.

Contrary to both Allen and Codrington independent Claim 19 is directed to a first reference structure, a second reference structure, and a controller that can correlate the

position of the first reference structure and the second reference structure. One reference structure is in the image reference frame and the other reference structure is in the patient reference frame. Independent Claim 19 is also directed to a tracking system operable to determine the position of the second reference structure. Allen is directed to determining a single position of an object relative to an internal coordinate system defined within a patient by fiducials. The object can be defined relative to the fiducials with mathematical formulae, etc. Allen does not teach or fairly suggest tracking a second reference structure or a controller to correlate a position of a first reference structure and a position of a second reference structure.

Independent Claim 87 is a method directed to identifying the first reference structure, identifying the second reference structure, correlating the position of the first reference structure and the second reference structure, and tracking an active member in the patient reference frame for display relative to the image reference frame. Allen does not teach or fairly suggest tracking an active member in the patient reference frame for display relative to the image reference frame.

Independent Claim 73 is directed to an active member operable to perform an intervention inside a region of the patient and a tracking system operable to track the position of the active member in relation to the patient reference frame. As discussed above, Allen does not teach or fairly suggest an active member or tracking system for tracking the position of the active member. Codrington does not overcome this failing of Allen because Codrington does not teach or fairly suggest a tracking system. This is also true for each of the independent Claims 19, 73, and 87.

Further, regarding Claim 73, Codrington specifically requires imaging of the instrument positioned within the patient with a magnetic resonance imaging system. Codrington teaches positioning the instrument so that it will disturb the magnetic field to produce a distortion in the image data obtained of the patient. Thus, rather than determining a position of the instrument in a patient reference frame, image reference frame, or any reference frame, Codrington only teaches obtaining image data of the patient and the instrument simultaneously to have image data of the instrument within the patient. Therefore, neither Allen nor Codrington, either alone or in combination, teach or fairly suggest a tracking system operable to track an active member relative to a reference frame, as claimed in Claim 73.

Van Steenwyk et al. and Strohl Jr. et al. are directed to devices able to indicate their proximity to a single element. In particular, Strohl Jr. et al. includes LEDs to provide an indication to a user whether a detector is in front of or behind a locator. Strohl Jr. et al., however, does not teach or fairly suggest determining a location of an active member or reference structure relative to a reference frame, displaying the location, or many other elements currently recited in the various claims. Similarly, Van Steenwyk et al. is directed to a hand held search probe that includes two coils that allows for monitoring of phase and amplitude detected from a coil positioned within an instrument. Again, Van Steenwyk et al. does not teach or fairly suggest determining a position of an active member or reference structure relative to a reference frame or displaying the position. In addition, neither Van Steenwyk et al. nor Strohl Jr. et al. teach or fairly suggest tracking an active member or reference structure with a tracking system, rather Van Steenwyk et al. and Strohl Jr. et al. require a coupling of the locating

device and the catheter to simply detect a phase variance or amplitude variance to estimate a distance between the locating device and the catheter.

Lewin is directed to a device for measuring a change in location or attitude of a rigid body in space, such as teeth, jaw, or the like. Lewin, however, does not teach or fairly suggest a determination of a reference structure or a position of an active member in any reference frame.

In addition to the independent claims, which Applicants submit are in condition for allowance, Applicants also believe that the dependent claims include patentable subject matter in addition to that recited in various independent claims. For example, dependent Claim 30 recites “the marker device is a telemetry system operable to determine the position of the second reference structure”. Applicants respectfully submit that the recited art, either alone or in combination, does not teach or fairly suggest the marker device as a telemetry system. While a sensor can be used to determine a phase and amplitude variance, such as in Van Steenwyk et al. and Strohl Jr. et al., neither are telemetry systems to determine the position of a reference structure.

Dependent Claim 54 is directed to the display displaying a real time position of the active member in the image reference frame. As discussed above, the cited art, either alone or in combination, does not teach or fairly suggest a controller to determine a position of the active member. Further, the cited art, either alone or in combination, does not teach a display to display a real time position of the active member in the image reference frame. Although Codrington includes a catheter that can disrupt the magnetic fields to produce an image variance in the image data obtained of the patient,

Codrington does not include a display to display a real time position of the active member in an image reference frame.

Dependent Claim 56 includes "the image data is displayed perpendicular to a direction of intervention of the active member." As discussed above, the cited art does not teach or fairly suggest displaying an active member relative to the image data. Even Codrington only images a catheter and does not teach or fairly suggest a display perpendicular to the direction of the intervention.

Applicants submit that each of the other dependent claims also includes patentable subject matter, and those included above are merely for exemplary purposes.

ALLOWABLE SUBJECT MATTER

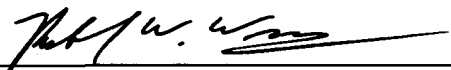
The Examiner states that Claims 1-16 are allowable over the prior art of record. The Examiner states that Claims 62-64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, Applicants have non-narrowingly amended Claims 62 and 63 to include the limitations of the base claim and any intervening claims. Therefore, Claims 62-64 should now be in condition for allowance. Applicants submit that no new matter has been added and that these claims are fully supported by the application as filed, including col. 17 ln. 63 to col. 18 ln. 2.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: Nov. 10, 2006

By: 
Richard W. Warner, Reg. No. 38,043
Michael L. Taylor, Reg. No. 50,521

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

RWW/MLT/srh